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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/978,199	10/17/2001	Gregory P. Pogue	42202	4164

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EXAMINER	
HELMER, GEORGIA L	
ART UNIT	PAPER NUMBER
1638	

DATE MAILED: 01/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/978,199	POGUE ET AL.	
	Examiner	Art Unit	
	Georgia L. Helmer	1638	

-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 November 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *5-10 and 33-39* is/are pending in the application.

4a) Of the above claim(s) *34-39* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *5-10 and 33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) ~~34-39~~ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 29 November 2004 has been entered.

Status of the Claims

2. Applicant has amended claims 5, 7, and 9. New claims 34-39 have been added. Claims 5-10 and 33-39 are pending. New claims 34-39 are withdrawn as being drawn to a nonelected invention. Claims 5-10 and 33 are examined in the instant action.

3. All rejections not addressed below have been withdrawn.

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Election/Restrictions

5. Since Applicant has received an action on the merits for the originally presented invention, Group II, claim(s) 5, 6, 7,8, 9, and 10, drawn to recombinant RNA viruses, class 435 subclass 235.1, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 5-10 and 33 are examined. New claims 34-39 are drawn to plants

infected with a virus where the plant produces lysozyme, class 800, subclass 298, for example. The new claims are distinct from the previous claims because the plants of the new invention are not required for the making and using the previous inventions, and vice versa.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper. Because these inventions are distinct for the reasons given above and the search required for the previous claims groups is not required for ten new claims restriction for examination purposes as indicated is proper. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 5-10 and 33 are examined in the instant action and new claims 34-39 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 112-second

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> **The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.**

7. Claims 5-10 and 33 are rejected under 35 U.S.C. 112-2nd.

In claim 5, 3rd line, "infecting a plant without another virus" is ambiguous. Does the plant not have another virus? Or is Infecting "without another virus"? Or something else meant? All subsequent recitations of this language are also rejected.

Clarification/correction is required.

Claim Rejections - 35 USC § 112-1 written description.

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 5-10 and 33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claims are drawn to a recombinant RNA plant virus comprising a nucleotide sequence encoding bovine lysozyme, where the plant virus comprises SEQ ID NO: 1, to an RNA molecule comprising a first viral subgenomic promoter, a second viral subgenomic promoter, and a bovine lysozyme coding sequence under control of either the first or the second viral subgenomic promoter, where the coding sequence is SEQ ID NO: 1, to a recombinant comprising a nucleotide

sequence encoding bovine lysozyme, where the bovine lysozyme is SEQ ID NO: 1. However, no recombinant RNA plant viruses, no RNA molecules comprising a first viral subgenomic promoter, a second viral subgenomic promoter, and a bovine lysozyme coding sequence under control of either the first or the second viral subgenomic promoter, and no recombinant tobamoviruses other than SEQ ID NO: 1-3 are described.

The specification does not disclose what biological or structural features would be present in the recombinant RNA plant viruses, the RNA molecules comprising a first viral subgenomic promoter, a second viral subgenomic promoter, and a bovine lysozyme coding sequence under control of either the first or the second viral subgenomic promoter, or the recombinant tobamoviruses which would are necessary for the function of these sequences and viruses in order for them to function in the claimed invention.

There is no structural description information, other than SEQ ID NO: ID NO: 1-3 , is given. Applicants are claiming a genus of sequences, yet there is no description of the structural features that define the genus.

See *University of California v. Eli Lilly*, 119 F.3d 1559, 43 USPQ 2d 1398 (Fed, Cir. 1997), where it states: "The name cDNA is not in itself a written description of that DNA; it conveys no distinguishing information concerning its identity. While the example provides a process for obtaining human insulin-encoding cDNA, there is no further information in the patent pertaining to that cDNA's relevant structural or physical characteristics; in other words, it thus does not describe human insulin cDNA . . . Accordingly, the specification does not provide a written description of the invention . . ."

Therefore, given the lack of written description in the specification with regard to the structural and physical characteristics of the claimed compositions,

one skilled in the art would not have been in possession of the genus claimed at the time this application was filed. (see Written Description Requirement published in Federal Register/Vol.66, No. 4/ Friday, January 5, 2001/Notices; p. 1099-1111.)

Therefore, given the lack of written description in the specification with regard to the structural and physical characteristics of the claimed compositions, one skilled in the art would not have been in possession of the genus claimed at the time this application was filed.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 5-10 and 33 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the SEQ ID NO: 1 and , p1044-bovine lysozyme, ATCC Dept No. 2599, does not reasonably provide enablement for all RNA plant viruses, all viral subgenomic promoters, all recombinant tobamoviruses or the broad scope of the claims. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

Enablement is considered in view of the *Wands* factors (MPEP 2164.01(a)). *In re Wands,* 858/F.2d 731, 8 USPQ2d 1400 (Fed. Cir. 1988). *In re Wands* lists a number of factors for determining whether or not undue

experimentation would be required by one skilled in the art to make and/or use the invention. These factors are: the quantity of experimentation necessary, the amount of direction or guidance presented, the presence or absence of working examples of the invention, the nature of the invention, the state of the prior art, the relative skill of those in the art, the predictability or unpredictability of the art, and the breadth of the claims.

The breadth of the claims: Applicant's claims are drawn to a recombinant RNA plant virus comprising a nucleotide sequence encoding bovine lysozyme capable of replicating in and systemically infecting a plant without another virus while expressing a biologically active lysozyme, to an RNA molecule comprising a first viral subgenomic promoter, a second viral subgenomic promoter, and a bovine lysozyme coding sequence under control of either the first or the second viral subgenomic promoter, and to recombinant tobamoviruses comprising a nucleotide sequence encoding bovine lysozyme, where the bovine lysozyme is SEQ ID NO: 1.

Enablement is considered in view of the *Wands* factors (MPEP 2164.01(a)). The enablement issues are: all recombinant RNA plant virus, an RNA molecule, all recombinant tobamoviruses virus , and RNA viruses able to systemically infecting a plant without another virus while expressing a biologically active lysozyme.

Guidance and working examples: Applicant recites a nucleic acid molecule (Example 1) encoding bovine lysozyme, inoculation of *Nicotiana* (Example 2, page 18) with "tobacco mosaic virus vector expressing bovine

lysozyme", extraction of bovine lysozyme and purification of bovine lysozyme from whole plants, and turbidimetric assays of the bovine lysozyme enzymatic activity (Example 3). Applicant has given no information about where in the plant the expression occurs, as the samples are from whole plants.

State *if the Art and Predictability:*

Accordingly to Applicant, "not all recombinant foreign genes are capable of being expressed by a RNA plant virus". (See Applicant's Response of 15 October 2003, p. 7-9.) Applicant set forth:

"[I]n order to infect and replicate an RNA virus in plants and for the foreign to be expressed many events must occur, some of which are not predictable.... These include: i) the recombinant virus with the lysozyme gene must be able to replicated in the plant cell, ii) the recombinant virus must retain the lysozyme sequence long enough to made the protein, iii) the specific recombinant construct must be compatible with the host plant cell, iv) to infect the whole plant the recombinant virus must be able to move through the growing parts of the plant while retaining the lysozyme gene , v) the virus capsid must be able to assemble and to encompass both the viral genome and the additional lysozyme gene, vi) the lysozyme gene must be expressed and not degraded by the plant cell, vii) the expressed lysozyme must be retained by the plant sufficiently to protect it from bacterial infections, and viii) unlike vectors containing a lysozyme gene, infectious viruses must retain all the other biological properties in order to infect that a whole plant."

Experimentation required: Many experiments, beginning with any RNA plant virus of any of the groups including of potyvirus, potexvirus, tobusvirus, tobamovirus, luteovirus, afmrovisu, tymovirus, sebemovirus, comomvirus, nepovirus, bromovirus, cucumovirus, harvius, hordeivirus, trobavirus, furovirus, and dianthovirus, for example, (see Matthews, R.E.F., Plant Virology, Academic Press, San Diego, 1991, pages 196-197) would need to be evaluated for the ability to infect and replicate in a host plant while comprising a foreign gene, to determine which might be candidates for the recombinant virus which would function without the presence of another virus, while still able to express a biologically active bovine lysozyme in the whole plant. In fact, this would require virtually an infinite number of experiments to practice the claimed invention. This would require excessive experimentation and impose undue burden on one of ordinary skill in the art.

In view of the breadth of the claims (any recombinant RNA plant virus, any RNA molecule, expression the whole plant and any recombinant tobamovirus), the lack of guidance, the unpredictability of the art, undue trial and error experimentations would be required to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim Rejections - 35 USC § 103

11. Claims 5-10 and 33 are rejected under 35 U.S.C. 103(a) as being obvious over Mirkov, et. al. US # 5,850,025, issued 15 December 1998, in view of Donson, et. al., US # 5,316,931, issued 31 May 1994, for reasons of record and for reasons discussed below.

Mirkov teach production of bovine lysozyme (col 11, lines 15-24) (col 5, lines 1-23 and col 9, lines 12-23) by a plant comprising a bovine lysozyme gene . The enzyme produced by Mirkov has the appropriate antigenic binding characteristics and size of the bovine lysozyme (Figure 5). The lysozyme thus produced maintains biological activity, as conferring reduced susceptibility of the plants to bacterial infection (Example 6, col 35).

Mirkov does not teach a recombinant RNA molecule comprising a first viral subgenomic promoter, a second viral subgenomic promoter and a bovine lysozyme coding sequence under control of either the first or the second subgenomic promoter.

Applicant traverses, stating primarily (27 August 2004 Response, p. 4) that Mirkov does not teach producing biologically active lysozyme in plants. Applicant's traversal has been considered and is unpersuasive. Mirkov teaches the production of bovine lysozyme in transgenic plants(c. 29 lines 10-40). This describes sampling of kanamycin resistant transgenic tobacco plants, and determination of the appropriate antigenic activity of the protein produced. Mirkov's statement (c. 29, line 34 and 35), however is inconsistent. This says

that "each of the transgenic plants expressed varying amounts of the P. pastoris produced bovine lysozyme ". However, the P. pastoris produced bovine lysozyme was being used as a control for this experiment.(c 29, line 22-24). Mirkov proceeds saying (line 37-40) that comparison of the size of the bovine lysozyme protein expressed in the plants with that expressed in P. pastoris indicated that the signal sequence was correctly cleaved in the transgenic tobacco plants.

Donson teaches recombinant tobamoviruses and plant viral subgenomic promoters (col 4, lines 65 bridging to col 5, line 8) controlling non-native coding sequences. Donson teaches the value of using a recombinant virus comprising viral subgenomic promoters to express proteins to confer bacterial resistance to plants. Thus, Donson provides motivation to substitute the bovine lysozyme of Mirkov for the proteins of Donson (col 12, lines 23-40) for use in producing a plant with reduced susceptibility to bacterial infection.

It would have been obvious to one of skill in the art, at the time of the invention was made, to substitute for the viral vector of Donson, the bovine lysozyme of Mirkov. One skilled in the art would have been motivated to so, with a reasonable expectation of success.

Accordingly, Mirkov in view of Donson renders obvious the claimed invention.

Remarks

12. No claims are allowed.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Georgia L. Helmer whose telephone number is 571-272-0796. The examiner can normally be reached on 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amy Nelson can be reached on 571-272-0804. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.
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access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

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Georgia Helmer PhD
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Art Group 1638
January 21, 2005

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